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means for comparing the detected fiducial alignment with a predetermined fiducial alignment that uniquely distinguishes between symmetric alignments of the leads.

Concluded

REMARKS

1. Status of the Application

At the outset Applicant wishes to thank Examiner Chang for the courtesies extended to Applicant's attorney Maria Comninou during a telephonic interview on June 1, 2001 and follow-up interviews on June 7 and 12, 2001.

Claims 30-37 and 44-69 and 72-75 are pending in the application. Applicant deems that claims 57-60 are withdrawn because they depend on previously withdrawn claim 55, as requested in Amendment and Response to Office Action dated April 19, 2001. Applicant reserves the right to prosecute all the withdrawn claims at a later time. Accordingly, Applicant is not presently addressing the Examiner's rejections of claims 57-60.

Claims 30-37, 44, 48-51, 53-54, 57- 62, 64, 67, 72, and 74 -75 stand rejected.

Claims 53-54 have been cancelled without prejudice.

2. Claim Objections

The informality in claim 62 has been corrected and Applicant respectfully requests reconsideration and removal of the objection to this claim.

3. Claim Rejections - 35 USC §112

Claims 53- 54 and 57-60 are rejected under 35 USC §112, second paragraph. The rejections of claims 57-60 are not addressed at this time, because these claims are deemed to be withdrawn. Claims 53-54 have been cancelled.

4. Claim Rejections - 35 USC §103(a)

Claims 30-32, 34-37, 44, 48-51, 61, 64, 67, and 74-75 stand rejected under 35 USC §103(a) as being unpatentable over U.S. Patent No. 5,040,291 to Janisiewicz et al. ("Janisiewicz") in view of U.S. Patent No. 5,442,460 to Hidese ("Hidese") and in further view of U.S. Patent No. 5,787,577 to Kent ("Kent").

As was discussed in the specification (page 2, line 2 to page 3 line 6) as originally filed, electrical components that have a symmetrical alignment of leads can appear to be properly aligned even though they are 180° out of alignment. For example, in the case of rectangular components with symmetric leads on both sides, such as that rectangular component shown in Figure 1(a), if one were to merely rely on the position of the leads, one could conclude that the component is in a desired alignment when, in fact, the component is 180° out of alignment. In case of square components with symmetric leads on all sides as shown in Fig. 2(a)^(b), those components could appear to be properly aligned when, in fact, they are or more 90° out of alignment. In at least some applications, although the components **appear to be** symmetric (because of their packaging), they do not function properly in all positions of this apparent symmetry, except in exceptional cases (page 2, lines 32-34). In such applications, the components function properly only when connected in a **predetermined lead alignment** that corresponds to one of the symmetric alignments. For this reason, one embodiment of Applicant's invention includes placing a physical or superficial fiducial marker on the component that distinguishes the correct alignment of the leads on the component from a symmetric alignment which is not correct, thereby creating a "fiducial alignment"). The fiducial alignment can be detected and compared with a predetermined fiducial alignment that **uniquely distinguishes between symmetric alignments of the leads** (p.5, lines 21-23, p. 3, lines 19 – 31, p. 5, lines 17 – 29). The specification also distinguishes between the predetermined lead alignment of the component and the fiducial alignment, which is created by providing the fiducial marker (p. 3, lines 23-28) on the component.

Each of the amended independent claims 30, 44, 61, 64, 72 includes a fiducial alignment detector and controller with instructions, which, when executed by the controller, cause the controller to compare a detected fiducial alignment with a predetermined fiducial alignment that alignment that **uniquely distinguishes between symmetric alignments of the leads**. Claim 74 is written in means plus function form and recites means for detecting a fiducial alignment and means for comparing the detected fiducial alignment with a predetermined fiducial alignment that **uniquely distinguishes between symmetric alignments of the leads**. Such fiducial alignment detector and corresponding controller (or means for detecting and means for comparing) are not disclosed or suggested by either Janisiewicz or Kent or Hidese, individually

or in combination. The Office Action provides that Hidese discloses "comparing a detected fiducial alignment or a detected alignment of the fiducial marker (four corners a-d of outer leads 3c) with a predetermined fiducial alignment (col. 4, lines 31-33) thereby minimizing product defects from misplaced components". However, Hidese does not disclose how to uniquely distinguish between symmetric alignments of the leads nor does it even recognize the existence of such a problem. Hidese only measures positional deviations of the four corners a, b, c, and d. Thus the component of Figure 5 will be considered to have been placed correctly by Hidese, whether it is aligned at 0° or 180° , because in both cases the positional deviations will be zero. The embodiments of Applicant's claimed invention solve this and other problems by comparing a detected fiducial alignment with a predetermined fiducial alignment that uniquely distinguishes between symmetric alignments of the leads. Therefore, the independent claims 30, 44, 61, 64, 72 and 74 are patentable over the cited prior art and, at least for this reason, the claims that depend from them 31, 32, 34-37, 48-51, 62, 67, 69-71 and 75 are also patentable.

Claims 33 and 72 were rejected under 35 USC §103(a) as being unpatentable over Janisiewicz and Kent and in further view of U.S. Patent No. 4,914,809 to Fukai et al. ("Fukai"). Claim 33, which depends from amended claim 30, and amended claim 72 are patentable over Janisiewicz, Kent and Hidese, individually or in combination, as discussed above. Fukai does not disclose a controller with instructions, which, when executed by the controller, cause the controller to compare a detected fiducial alignment with a predetermined fiducial alignment that **alignment that uniquely distinguishes between symmetric alignments of the leads** and adds nothing to the combination of the cited prior art to make claims 33 and 72 unpatentable. Therefore, claims 33 and 72 are patentable over the cited art.

Claims 62 was rejected under 35 USC §103(a) as being unpatentable over Janisiewicz in view of Kent and in further view Fukai. Claim 62 depends from amended claim 61, which is patentable over Janisiewicz, Kent and Hidese, individually or in combination, as discussed above. Kou does not disclose a controller with instructions, which, when executed by the controller, cause the controller to compare a detected fiducial alignment with a predetermined fiducial alignment that **alignment that uniquely distinguishes between symmetric alignments of the leads**. Therefore, claim 62 is patentable over the cited art, including Kou.

5. Conclusion

Applicant has made a diligent effort to place the present application in condition for allowance. Applicant submits furthermore that no new matter has been introduced in the amendments presented herein. Accordingly, a Notice of Allowance to allowance at an early date is solicited. If the Examiner is of the opinion that the instant application is in condition for disposition other than allowance, the Examiner is respectfully requested to contact Applicant's Attorney at the telephone number listed below in order that any such concerns may be expeditiously addressed.

Respectfully submitted,

 

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Version With Markings to Show Changes Made in 09/466,521

In the claims

Claims 53-54 were cancelled.

Claims 57-60 were withdrawn

Claims 30, 44, 61, 62, 64, 72, and 74 were amended as follows:

30. (Thrice Amended) A component transfer apparatus for transferring a component having leads, said apparatus comprising:

a pick and place machine including a controller connected to a movable pick head and a component feed source, said pick head having access to said component feed source; and

a fiducial alignment detector comprising a receiver directed toward said feed source and connected to said controller, wherein said controller contains instructions which, when executed by said controller, cause said controller to compare a detected fiducial alignment with a predetermined fiducial alignment that [is indicative of a predetermined lead alignment] uniquely distinguishes between symmetric alignments of the leads.

44. (Twice Amended) A component transfer apparatus for a component having leads, said apparatus comprising:

a pick and place machine having a component feed source and a movable pick head having access to said component feed source;

a fiducial alignment detector directed toward said component feed source; and

a controller coupled to said fiducial alignment detector and containing instructions which, when executed by said controller, cause said controller to compare a detected fiducial alignment with a predetermined fiducial alignment that [is indicative of [a predetermined lead alignment] uniquely distinguishes between symmetric alignments of the leads .

61. (Twice Amended) A component transfer apparatus for a component having leads, said apparatus comprising:

a pick and place machine having a component feed source and a movable pick head having access to said component feed source;

a fiducial alignment detector directed toward said component feed source and having an alignment signal output; and

a controller coupled to said detector alignment signal output and containing instructions which, when executed by said controller, cause said controller to compare a detected fiducial alignment with a predetermined fiducial alignment [is indicative of a predetermined lead alignment] uniquely distinguishes between symmetric alignments of the leads.

62. (Twice Amended) The component transfer apparatus of claim 61, wherein said alignment signal output is a warning [prompt].

64. (Twice Amended) A component transfer apparatus for a component having leads, said apparatus comprising:

a pick and place machine having a component feed source and a movable pick head having access to said component feed source;

a fiducial alignment detector directed toward said component feed source; and a controller coupled to said detector and containing instructions which, when executed by said controller, cause said controller to compare a detected fiducial alignment with a predetermined fiducial alignment that [is indicative of a predetermined lead alignment] uniquely distinguishes between symmetric alignments of the leads, and cause said movable pick head to pick a component from said component feed source.

72. (Twice Amended) A component transfer apparatus for a component having leads, said apparatus comprising:

a pick and place machine having a component feed source and a moveable pick head, wherein said component feed source includes at least one nest that defines an asymmetric recess and said moveable pick head has access to said component feed source;

a fiducial alignment detector directed toward said feed source;

a controller containing instructions which, when executed by said controller, cause said controller to compare a detected fiducial alignment with a predetermined fiducial

alignment that [is indicative of a predetermined lead alignment] uniquely distinguishes between symmetric alignments of the leads and cause said controller to advance said component feed source.

74. (Twice Amended) A component transfer apparatus for a component having leads, said apparatus comprising:

component conveying means;
means for detecting a fiducial alignment adjacent said component conveying means; and

means for comparing the detected fiducial alignment with a predetermined fiducial alignment that [is indicative of a predetermined lead alignment] uniquely distinguishes between symmetric alignments of the leads.